Space Weather Forecast

Issued on Friday, 09 September 2022 at 13:13 Local

This forecast provides a four-day assessment of space weather events. The probabilities stated below are for reaching or exceeding the given levels. For more information about space weather impacts please see the Met Office Space Weather Scales https://www.metoffice.gov.uk/weather/learn-about/space-weather/uk-scales

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Space Weather Forecast Headline: No significant activity.

Analysis of Space Weather Activity over past 24 hours

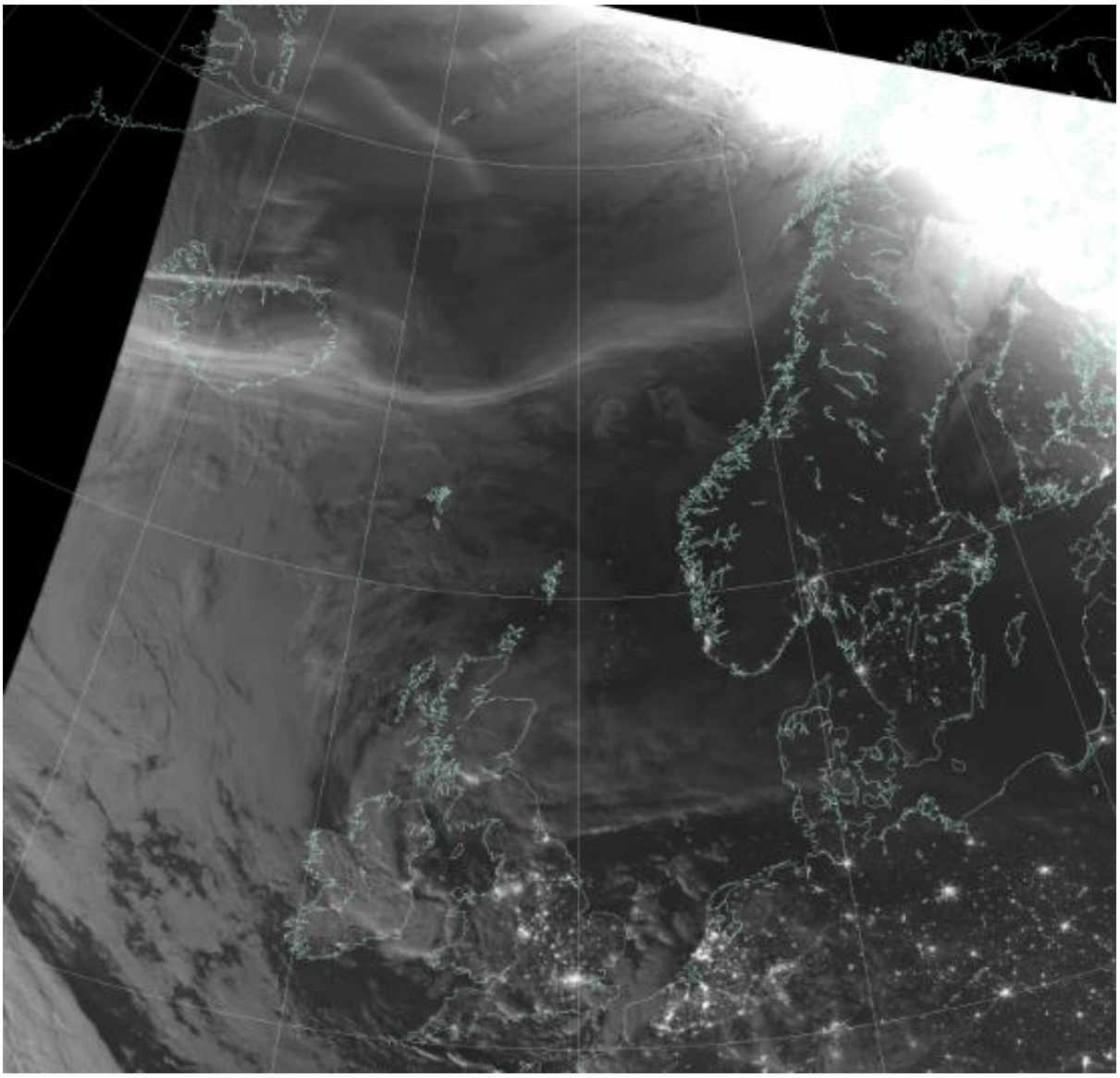

Figure 1: Infra-red corrected low-light level satellite imagery of northwestern Europe at 09/0103UTC, showing a slightly enhanced auroral oval traversing the Arctic Ocean between Iceland and Norway. Also visible are major conurbations' lights, the edge of the overpass swathe (black), and the saturated white day-night terminator over Scandinavia.

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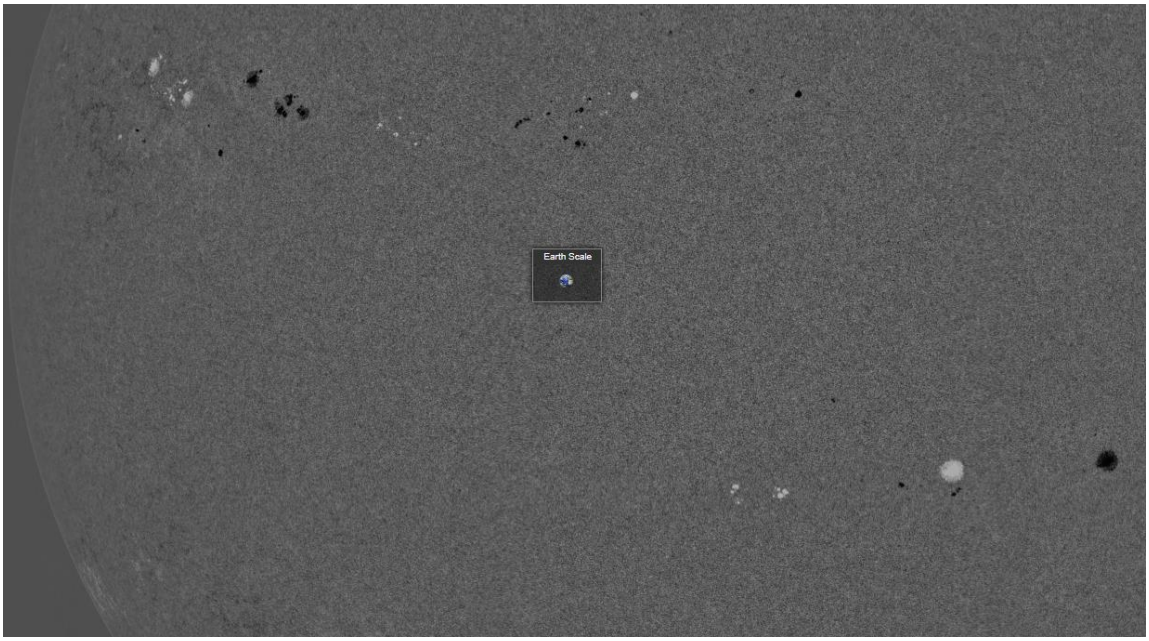
Solar Activity: Solar activity was low over the past 24 hours, with X-ray activity showing an overall slight decrease with occasional low-magnitude common-class flares. The largest of these flares appeared to emanate from a small sunspot group in the Sun's northeast at 08/1711UTC. This was one of two main sunspot regions on the facing side in terms of magnetic complexity, with some spot proliferation and spreading, although both eased with time. The other main occupant was a larger but less active group to its east.

There were up to seven regions on the Sun all in, however with the above exceptions these were all stable or else decaying unremarkable magnetic dipoles or else (apparent) monopoles.

Satellite imagery in the period was dominated by emissions from behind each solar horizon in the southern solar hemisphere - initially a slow but visually large event from behind the southwest horizon during the UTC afternoon of 08 September, and a second more energetic but narrower emission from around the eastern side during the same evening. Neither of these above events should affect Earth, and there was therefore no evidence of any Earth-directed Coronal Mass Ejections (CMEs).

Figure 2: Helioviewer.org-generated difference imagery for the Sun in visible light between 08/0600UTC and 09/0600UTC, showing evolution of the current facing-side sunspot groups. Current positions are shown in black, with those 24 hours prior in white. The two largest groups in the upper left of the image can be seen to be the most changed. Shown for scale are both the Earth and the eastern solar horizon, the latter also harbouring a (faintly visible) potential new sunspot group (TBC).



Solar Wind / Geomagnetic Activity: The solar wind was indicative of a very slowly waning 'coronal hole' fast wind regime.

The solar wind speed showed an erratic tendency from elevated into slightly elevated territory in the past 24 hours, with the number of particles comprising the wind and their tied magnetic field both within their normal background range. The north-south component of the field was more noteworthy, spending protracted periods of time between co-alignment and anti-alignment with the Earth's field, with a noteworthy anti-aligned spell from 09/0600UTC.

The net result of the above solar wind measures was nevertheless below Minor Geomagnetic

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Storm G1, falling just short of this in the 21-24UTC interval.

Energetic Particles / Solar Radiation: No solar radiation storms were observed, with a very slight enhancement (substantially below S1) perhaps related to the western rearward-directed CME.

Four-Day Space Weather Forecast Summary

Solar Activity: Solar activity is expected to be largely low, but with a daily slight chance of becoming moderate with isolated Moderate-class flares, most likely from one of the two more complex front side regions discussed above. The far side of the Sun potentially harbours the surviving remnants of a sunspot group a couple of days from returning to the facing side. This may be something to watch later in the UTC weekend, however for now a flat 5% risk of Moderate-class flares is maintained.

Solar Wind / Geomagnetic Activity: No Earth-directed CMEs currently feature in the forecast.

The current fast wind regime is the only one to feature in the coming four days, and as such near G-scale geomagnetic activity (narrowly below Minor Storm G1) should become less frequent into the UTC weekend, and reliably quiet from day three, Sunday 11 September.

Energetic Particles / Solar Radiation: No solar radiation storms are expected, with repeats of the current slight enhancement considered unlikely.

Geomagnetic Storms:

Geo-Magnetic Storm Probability (Exceedance)	Level	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Minor or Moderate	**G1 to G2**	No	20	1	1	1
Strong	**G3**	No	1	1	1	1
Severe	**G4**	No	1	1	1	1
Extreme	**G5**	No	1	1	1	1

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Radio Blackouts - X Ray Flares:

X Ray Flares	Level	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC)	Day 2 (00-24 UTC)	Day 3 (00-24 UTC)	Day 4 (00-24 UTC)
Probability			(%)	(%)	(%)	(%)
Active	R1-R2 M Class	No	5	5	5	5
Very Active	R3 to R5 X	No	1	1	1	1

Solar Radiation Storms - (High Energy Protons):

Radiation Storms	Level (cm^{-2} sr^{-1} s^{-1})	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC)	Day 2 (00-24 UTC)	Day 3 (00-24 UTC)	Day 4 (00-24 UTC)
Probability (Exceedance)			(%)	(%)	(%)	(%)
Active	≥ S1	No	1	1	1	1
Very Active	≥ S3 *	No	1	1	1	1
* S3 ≥ 10 MeV ≥ 1000 pfu and / or ≥ 50 MeV ≥ 10 pfu. (pfu = $cm^{-2}sr^{-1}s^{-1}$)						

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